

Bertazzi PA, Bernucci I, Brambilla G, Consonni D, and Pesatori A. "The Seveso Studies on Early and Long-Term Effects of Dioxin Exposure: A Review." *Environmental Health Perspectives*. 1998 Apr; 106 Supplement 2:625-33. (Reviewed by Grace Wang)

The Bertazzi et al. article reviews studies conducted following an industrial accident that occurred in Seveso, Italy, in 1976, in which a large human population experienced high level exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, or commonly referred to as dioxin) after a herbicide plant explosion. There are three main components to the studies. First, the level of contamination is determined in the surrounding areas by measuring soil samples' TCDD concentration over a period of 10 years after the incident. Three areas were mapped out: A, B, and R, for heaviest, medium, and lowest contaminations, respectively.

Second, other studies focus on human health effects. Immediate effects include nausea, headache, eye irritation, and skin lesions. For early and mid-term effects, researchers selected subjects who contracted skin lesions and chloracne due to direct contact to TCDD, and examined hepatic function, total cholesterol and serum triglycerides, and nerve conduction until 1985. In comparison to a control population, there are no substantial differences in these studies. The findings regarding TCDD-induced abortion rates are not significant due to small sample population. Another interesting phenomenon is that the male/female birth ration decreased following the incident.

Third, to measure long-term effects, researchers collected data of deaths and causes of deaths in the affected areas following the incident and analyzed these data in a Poisson distribution. Although total death rate is not significantly different from control population, cardiovascular excess and respiratory disease mortality show a significant increase. The authors argue this could be due to direct chemical effects or emotional stress caused by the event. Deaths due to diabetes mellitus show a suggestive though statistically non-significant increase. These reports do not provide conclusive results. Current research is focusing on cancer incidence.

Critique

Although this paper does not directly address Willamette River pollution's human health effect, it is a thorough study of human health effects of the chemical dioxin. In a previous review (Miller JD. et al. Willamette River Basin Task Force: Recommendations to Governor John Kitzhaber. Bureau of Land Management: 1997 Dec), I found that the Willamette River is subject to dioxin pollution.

The study by Bertazzi et al. is published in a trustworthy journal. The authors are responsible with their analysis of the data. They report not only observations of health effects, but also the statistical significance of dioxin pollution as a cause. A major advantage of this paper is that it review studies conducted over different time periods following a specific time of dioxin pollution, thus immediate, short-term, and long-term effects are traced. One disadvantage of this paper is that the particular population subject to the study experienced a high level of pollution. In comparison, the dioxin level in

the Willamette River is expected to be much lower. Nevertheless, this sheds light on potential harms of human exposure to dioxins. Another drawback of this paper is that it offers only speculations as to why dioxin might cause harm to human health, rather than offering mechanisms of dioxin's chemical and physiological activities in the human body. This makes the authors' argument less convincing.

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